

Advanced Algebra
Writing Exponential Functions

Name Key
Hour _____

Write an exponential function $y = ab^x$ for a graph that includes the given points.

1. (0, 2) (1, 1.3)

$$\begin{aligned} 2 &= ab^0 \\ 2 &= a \end{aligned} \quad \begin{aligned} 1.3 &= 2 \cdot b^1 \\ \frac{1.3}{2} &= \frac{2 \cdot b}{2} \\ b &= .65 \end{aligned}$$

$$y = 2 \cdot .65^x$$

2. (1, -8) (2, -32)

$$\begin{aligned} -8 &= a \cdot b^1 \\ a &= -\frac{8}{b} \end{aligned} \quad \begin{aligned} -32 &= -\frac{8}{b} \cdot b^2 \\ -32 &= -\frac{8b}{b} \\ -32 &= -8 \end{aligned}$$

$$b = 4 \quad y = -2 \cdot 4^x$$

3. (-3, 24) (-2, 12)

$$\begin{aligned} \frac{24}{b^3} &= \frac{a b^{-3}}{b^{-3}} \\ a &= 24b^3 \end{aligned} \quad \begin{aligned} 12 &= 24b^3 \cdot b^{-2} \\ 12 &= 24b \end{aligned}$$

$$y = 3 \cdot .5^x \quad a = 3, b = \frac{1}{2}$$

4. (2, 122.5) (3, 857.5)

$$\begin{aligned} \frac{122.5}{b^2} &= \frac{a b^2}{b^2} \\ a &= \frac{122.5}{b^2} \end{aligned} \quad \begin{aligned} 857.5 &= \frac{122.5 \cdot b^3}{b^2} \\ 857.5 &= 122.5b \end{aligned}$$

$$y = 2.5 \cdot 7^x$$

In words describe the translation of each function from the parent function $y = 3(2)^x$.

4. $y = 3(2)^{x+3}$

L3

5. $y = 3(2)^{x-6} + 4$

R6 u 4

6. $y = 3(2)^x - 7$

D7

Graph each function. Identify the horizontal asymptote. (You may use your calculator).

7. $y = (0.75)^x$

$$y = 0$$

8. $y = (0.25)^{x+1}$

$$y = 0$$

9. $f(x) = 5(0.2)^x + 3$

$$y = 3$$

10. $y = 81(1/3)^x - 2$

$$y = -2$$

11. $y = \frac{1}{2}(1/2)^x$

$$y = 0$$

12. $g(x) = (1/10)^x + 8$

$$y = 8$$